



The Great Lakes Land-based Marine Debris Action Plan

NOAA Marine Debris Program
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THE GREAT LAKES LAND-BASED MARINE DEBRIS ACTION PLAN

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Background on the Issue

Marine debris is defined as any persistent solid material that is manufactured or processed and directly or indirectly, intentionally or unintentionally, disposed of or abandoned into the marine environment or the Great Lakes. While perhaps more commonly thought of as an oceanic problem, the Great Lakes region, with its complex system of habitats, wetlands, rivers, and tributaries, is an area that is also affected by debris. In the Great Lakes, marine debris affects the beauty of our environment, is a health and safety hazard, threatens our wildlife and natural resources, and comes at an economic cost. From a beach covered in trash to an animal entangled in fishing line, marine debris is a problem we cannot ignore.



Figure 1. Map of the Great Lakes Basin. Credit: EPA.gov

Debris in the Great Lakes ranges from trash and litter items which are small in size to large abandoned and derelict vessels. Marine debris is generally classified into two broad categories of sources: ocean or lake-based and land-based. Ocean or lake-based debris are those materials that may be dumped, swept, or blown off both commercial and fishing vessels, as well as any stationary platforms at sea. Land-based debris is generated on land and may be blown, swept, or washed out to sea. This includes debris from littering, dumping in rivers and streams, storm water discharges, poor waste management practices, and industrial losses during production, transportation, and processing. Beach and shoreline cleanups like those conducted by the Adopt-a-Beach™ program typically target this type of debris.

Land-based marine debris in the Great Lakes is largely monitored by volunteers in the Adopt-a-Beach™ program, organized by the Alliance for the Great Lakes. This cleanup effort began in 1991 and now operates year-round. Data gathered on the type and amount of debris that is collected is entered into an online database. This data can be exported to the public and other agencies for use in monitoring marine debris. Along with marine debris monitoring, volunteers collect information on beach health.

In 2011, Alliance for the Great Lakes collected 595 litter monitoring forms for entry into the database. Initial results indicate that 48 percent of the land-based debris collected by volunteers is food-related items such as food wrappers/containers, beverage containers, bags, plastic eating utensils, etc. The second highest category of items collected during these cleanups in 2011, at 41 percent, was smoking-related and included cigarette filters, lighters, cigar tips, and tobacco product packaging.

Other items of interest included a significant collection of balloons and balloon strings, as well as firework debris. Balloon strings are significant because one of the most notable types of impacts from marine debris is wildlife entanglement. Entanglement can lead to injury, illness, suffocation, starvation, and even death for an animal. Adopt-a-Beach™ volunteers in the Great Lakes record wildlife entanglements and have found several instances of wildlife entangled in balloon strings as well as monofilament fishing line and rope.

A subtype of land-based marine debris that is of growing interest is plastic pellets, used in plastic manufacturing. These plastic pellets are considered a type of microplastic. Microplastics are debris particles that are composed of primarily synthetic particles and are less than five millimeters in size (Arthur et al. 2009). Plastic pellets typically enter the environment through accidental losses such as spillage of plastic resin pellets during production, transportation, and processing. Other sources of microplastics include the breakdown of larger plastic pieces through weathering and abrasion, and also potentially from use in personal care products.

The University of Western Ontario has done some research into the distribution of plastic, including pellets, by collecting data from beaches, wetlands, and boat landings along the shorelines of Lakes Huron. Initial results from this study indicate that most plastics in the Great Lakes are composed of polyethylene, polypropylene, and polyethylene terephthalate. Plastic pellets were found primarily on the southern Canadian beaches of Lake Huron, with the Sarnia Beach area having the highest amount of plastic pellets. Researchers speculate that this is likely due to current patterns in Lake Huron (Zbyszewski and Corcoran 2011). Further investigation is needed to determine the extent and distribution of these plastic pellets on the shorelines of the other Great Lakes, as well as their potential impacts to the region.

Besides being an eyesore and degrading the aesthetics of coastal environments, land-based marine debris typically impacts humans and the environment in several ways. In addition

to entanglement, wildlife can also ingest land-based marine debris, whether through the item being mistaken for food or the animal's accidental ingestion with natural food items. Debris ingestion may lead to loss of nutrition, internal injury, intestinal blockage, starvation, and death.

Humans are also impacted by land-based marine debris. Human health and safety becomes a concern with unsanitary forms of marine debris, such as medical waste, as well as encounters with unsafe types, such as broken glass. Economic impacts are increasingly a concern. These impacts are felt by those whose livelihoods are linked to the water, yet in many cases, the costs remain unknown. Less commonly considered are the impacts to navigation through the blockage of intake valves on boats and the ability of debris to transport alien or invasive species.

Plan Development

Recognizing that marine debris is a global problem, the wider marine debris community came together at the 5th International Marine Debris Conference in 2011 and developed the *Honolulu Strategy*. This strategy document is a framework document and is intended to be used as: 1) A planning tool for developing or refining spatially or sector-specific marine debris programs or projects; 2) A common frame of reference for collaboration and sharing of best practices and lessons learned; and 3) Monitoring tool to measure progress across multiple programs and projects (NOAA and UNEP 2011). As such, the *Honolulu Strategy* was used as guidance for the Great Lakes workshops and the development of the Great Lakes Land-Based Marine Debris Action Plan.

The marine debris community in the Great Lakes first met at a one-day convening hosted by the John G. Shedd Aquarium in Chicago, IL on July 22, 2011. Through a NOAA Office of Education grant, the Shedd Aquarium worked with the NOAA Marine Debris Program and the Alliance for the Great Lakes to bring together a diverse group to discuss the issues related to marine debris in the region. Participants identified a number of issues associated with Great Lakes debris, then grouped them into nine broad categories and prioritized them for follow-up. One of the top-tier issues they identified was the need to further refine the scope of the problem and to better define what is currently known on debris issues. In an effort to move forward with the results from the workshop in July 2011, the NOAA Marine Debris Program coordinated a follow-up two-day workshop on December 1-2, 2011.

At the Great Lakes Marine Debris Workshop in December 2011, NOAA and other federal and state agencies, and non-governmental organizations worked to develop a collective vision statement for a regional action plan, further define the state of knowledge on land-based debris, derelict fishing gear, and sawmill debris, and identify knowledge gaps (Opfer 2012). Land-based debris discussions centered on data collected by the Alliance for the Great Lakes, as well as Western University in Ontario. The final vision and mission

statements for the framing of a future action plan were refined post-workshop by a small working group and are as follows:

Vision Statement: The Great Lakes, its coasts, people, and wildlife are free from the impacts of marine debris.

Mission Statement: The Great Lakes will be free from marine debris through an increased understanding of the problem, preventative actions, reductions in impacts, and collaborative efforts of diverse groups.

Following the December 2011 workshop, it was evident that there is more known about land-based marine debris in the Great Lakes than all other classifications or types. To further efforts to address this debris type and meet the vision and mission statements, a workshop and series of follow-up webinars were held to develop a strategic action plan. Participants included NOAA, other federal and state agencies, local groups, academic institutions, and non-governmental organizations (Opfer 2012).

The two day workshop was held May 22-23, 2013 in Cleveland, OH at the City of Cleveland's Sustainable Cleveland Center and hosted by the NOAA Marine Debris Program, the Alliance for the Great Lakes, and Old Woman Creek National Estuarine Research Reserve (NERR). Participants at this workshop and in follow-up webinars developed realistic goals, objectives, and potential actions for a regional action plan to address land-based marine debris (Opfer 2013).

The final workshop was held February 20-21, 2014 in Chicago, IL at the Environmental Protection Agency Region 5 and hosted by the NOAA Marine Debris Program, the Alliance for the Great Lakes, and Old Woman Creek National Estuarine Research Reserve (NERR) (see Appendix I agenda, and Appendix II participants). The workshop was facilitated by Heather Elmer from Old Woman Creek NERR.

Workshop Objectives:

- Develop realistic actions to address land-based debris in the Great Lakes. At the conclusion of the workshop, groups engaged in land-based debris issues in the region will have the ability to use the publicized action plan to prioritize plans and make significant headway in addressing this issue.
- Identify organizations to lead specific actions, identify potential partners, potential funding sources, location(s), and outcomes.
- Finalize a 5-year land-based marine debris action plan for the region.
- Connect federal agencies, states, tribal nations, researchers, business leaders and non-governmental organizations in the Great Lakes region to identify potential opportunities for collaboration related to marine debris.
- Regionally support and contribute to the *Honolulu Strategy*. The *Honolulu Strategy* sets forth a results-oriented framework of action with the overarching international goal to reduce impacts of marine debris over the next 10 years. Outcomes of this

workshop will specifically support Goal A: Reduced amount and impact of land-based sources of marine debris introduced into the sea; & Goal C: Reduced amount and impact of accumulated marine debris on shorelines, in benthic habitats, and in pelagic waters.

The beginning of the first day included welcoming remarks from Mr. Cameron Davis, Senior Advisor on Great Lakes issues to the U.S. Environmental Protection Agency's Administrator. Following these remarks, participants were briefed on the outline of the workshop as well as a short reminder of previous work that has been completed on the action plan.

During the remainder of the workshop, participants were divided into breakout groups and were assigned review of objectives under each goal. A group was assigned no more than two objectives in one breakout session. During these breakout sessions, groups were instructed to review the potential actions that were developed at previous meetings, develop new actions for objectives, and also to brainstorm coordinators and partners to work on completing the actions.

Groups were then brought back together to report out on the actions that were refined and/or developed and to discuss them with the rest of the attendees. In this way, all participants were able to provide input on developed actions even though they may not have worked on them directly in their breakout group. Actions were also analyzed for similarities and differences in the instances when there was more than one group working on an objective.

During discussions of actions, it was determined that Goal 5: "*Strategic partnerships are developed and maintained to add value and invest resources to address Great Lakes land-based marine debris,*" should be removed as a goal from the final action plan. Participants felt that this particular goal's intent was focused more on partner interaction and structure of the plan. Therefore, this information is captured below in the Purpose/Governing Structure sections.

Plan Purpose

The overall purpose of the Great Lakes Land-based Marine Debris Action Plan is to establish a comprehensive framework for strategic action to ensure that the Great Lakes, its coasts, people, and wildlife are free from the impacts of marine debris. The plan encompasses work that will be undertaken in the next five years (2014-2019). Due to the complexity of marine debris issues, there is a role for everyone in the implementation of this plan, including the private citizen who picks up litter from our beaches and watersheds; federal, state, county, and local government agencies that are mandated to address the threat of marine debris; private businesses and industry that get involved to serve the communities in which they operate; and nongovernmental and academic organizations that support a wide range activities like cleanup, research, education, and

outreach. The Great Lakes Land-based Marine Debris Action Plan establishes goals, objectives, and action strategies to promote coordinated action to address the significant threats posed by land-based marine debris in the Great Lakes.

Plan Governing Structure & Future Monitoring

This action plan is centered on the development and maintenance of strategic partnerships to address Great Lakes land-based marine debris. New partnerships and linkages will continue to be developed, and existing strategic partnerships will be used to add value and invest resources to accomplish the goals set out in this action plan. As such, ownership of this plan belongs to the wider Great Lakes community.

Participants identified for each action strategy within the plan fall into one of two primary roles:

- Coordinator/Co-Coordinator – organization(s) that are responsible for reporting on progress, challenges, and completion of the action in progress reports and update calls, as well as to their action strategy team. They are responsible for undertaking activities that will fulfill the action strategy, maintaining communication and coordination with all of the listed partners on the action strategy, as well as welcoming participation from new partners that express an interest. These coordinators have been involved in finalizing the editing of their respective action strategies.
- Partner – organization(s) that provide input on progress and challenges for the action strategy to the coordinator. They are a member of their respective action strategy teams and are responsible for undertaking activities that will fulfill the action strategy.

In instances where there is no coordinator or partner listed for an action strategy, these actions will be tabled until one is identified. New coordinators and/or partners may be identified during the implementation of the plan. As new contacts and partnerships are made, they will be encouraged to review the action plan and participate in, or coordinate action strategy teams as they are able. Several action strategies do not require a coordinating organization, as noted in the plan. These particular actions will be captured as part of the regular progress reporting due to the large number of groups participating in these actions.

Regular communication is essential to maintain the strategic partnerships that have been, or will be developed to accomplish the various goals and objectives of this action plan. Therefore, there will be approximately two check-in calls/webinars per year to allow coordinators to share information on their action strategies. Documented progress on the Great Lakes Land-Based Marine Debris Action Plan will also be captured in an annual

progress report. The format is to-be-determined, but will likely be published as a technical document. The NOAA Marine Debris Program will facilitate overall coordination of check-ins and reporting, at least initially. This role may be adapted as the plan proceeds.

The Great Lakes marine debris community recognizes the need for this action plan to be evaluated and revisited within the 5-year timeframe. Unforeseen challenges or gaps may arise in the implementation of actions, which will limit progress on addressing land-based marine debris in the Great Lakes. Therefore, a mid-plan review and evaluation will be performed to help partners better understand which goals, objectives, and action strategies are well supported and projected to complete work, and where additional assistance may be needed or where gaps have been identified. Elements of the action plan may be adapted, and new actions or objectives may be added at this time. Upon the conclusion of the five years, the action plan will undergo a final evaluation and an accomplishments report will be generated. It is anticipated that next steps will be generated as part of this final evaluation.

The Great Lakes Land-Based Marine Debris Action Plan

Vision Statement: The Great Lakes, its coasts, people, and wildlife are free from the impacts of marine debris.

Mission Statement: The Great Lakes will be free from marine debris through an increased understanding of the problem, preventative actions, reductions in impacts, and collaborative efforts of diverse groups.

Goal 1: Knowledge gaps are identified and filled through research and monitoring of land-based marine debris.	
<i>Objective 1: By the end of 2016, develop a platform for long-term collaboration on Great Lakes marine debris research.</i>	
Action Strategies	Coordinating & Partner Organizations
1. Convene a small working group to discuss research community needs, timeline, scale, and intent for a future platform.	<u>Coordinator:</u> NOAA MDP <u>Partners:</u> University of Waterloo, Clean Water Action <u>Participants:</u> All research organizations
2. Once needs analysis is complete, examine existing platforms to meet those needs.	
<i>Objective 2: By 2016, convene researchers to foster partnerships and collaboration.</i>	
Action Strategies	Coordinating & Partner Organizations
1. Share current venue opportunities and identify invitees. Invitees should include those researchers who are currently involved in, or have an interest in land-based marine debris research in the region.	<u>Coordinator:</u> Alliance for the Great Lakes <u>Partners:</u> SUNY Fredonia, NOAA MDP, University of Wisconsin-Superior
2. Host a research panel or session at a regional conference.	<u>Coordinator:</u> University of Michigan <u>Partner:</u> University of Wisconsin-Superior
<i>Objective 3: Over the next five years, create summary documents of existing research on land-based marine debris and identify key data gaps for the research community.</i>	
Action Strategies	Coordinating & Partner Organizations
1. Publish synthesis paper on plastic marine debris research in the Great Lakes.	<u>Coordinator:</u> University of Waterloo

<p>2. Based on results of synthesis paper, perform a gap analysis to identify research needs in the region.</p>	<p><u>Coordinator:</u> NOAA MDP <u>Partners:</u> University of Waterloo, University of Western Ontario, University of Michigan, Loyola University, SUNY Fredonia, University of Wisconsin-Superior</p>
<p>Objective 4: <i>Through 2019, engage Great Lakes management communities to prioritize and foster implementation of relevant research topics.</i></p>	
<p>Action Strategies</p>	<p>Coordinating & Partner Organizations</p>
<p>1. Identify relevant management stakeholders and establish communication channels.</p>	<p><u>Coordinator:</u> Great Lakes Sea Grant Network <u>Partner:</u> GL National Estuarine Research Reserves (NERRs)</p>
<p>2. Through established communication channels, work with management stakeholders to develop a list of research questions that are of interest to the Great Lakes management community.</p>	<p><u>Coordinator:</u> Great Lakes Sea Grant Network <u>Partner:</u> NERRs</p>
<p>Objective 5: <i>Within the next five years, the Great Lakes research community will address knowledge gaps on land-based marine debris by completing and publishing a minimum of two studies.</i></p>	
<p>Action Strategies</p>	<p>Coordinating & Partner Organizations</p>
<p>1. Based on completed synthesis paper and gap analyses (Obj 3), develop a list of prioritized questions that need to be addressed and share it with regional research community.</p>	<p><u>Coordinator:</u> NOAA MDP <u>Partners:</u> Researchers, Alliance for the Great Lakes</p>
<p>2. Identify funding sources for land-based marine debris research, both current and future.</p>	<p><u>Coordinator:</u> University of Waterloo; University of Michigan <u>Partner:</u> Great Lakes Sea Grant Network, University of Wisconsin-Superior</p>
<p>3. Create and send a bi-national letter to inform potential funding officials of regional research needs for land-based marine debris.</p>	<p><u>Coordinator:</u> University of Waterloo; University of Michigan</p>

Objective 6: Through 2019, ensure data collection consistency and quality assurance by multiple users.	
Action Strategies	Coordinating & Partner Organizations
<p>1. Establish protocol/methodology to ensure metadata on land-based debris exists and is consistent for the following mediums:</p> <ul style="list-style-type: none"> a) Open & Nearshore Water b) Shoreline c) Deep & Nearshore Sediments d) Fisheries e) Water Infrastructure (wastewater systems, stormwater, etc.) 	<p><u>Coordinator:</u> SUNY Fredonia & University of Michigan <u>Partners (corresponding to mediums listed):</u></p> <ul style="list-style-type: none"> a) SUNY Fredonia, NOAA MDP, University of MI, University of Wisconsin – Superior b) Loyola University, University of Waterloo, Alliance for the Great Lakes, NOAA MDP c) University of Western Ontario, NOAA MDP d) State/Provincial Departments of Natural Resources e) SUNY Fredonia
<p>2. Establish opportunities to share and/or provide training on established protocols across the regional organizations. This may be completed in conjunction with Obj 2.</p>	<p><u>Coordinator:</u> Alliance for the Great Lakes <u>Partners:</u> SUNY Fredonia, NOAA MDP, University of Wisconsin-Superior, NERRs</p>
<p>3. Identify obstacles within quality assurance of data (ex. volunteer error) and make recommendations on how these obstacles can be resolved or clarified to data users.</p>	
Goal 2: A science-based and strategic approach is used to guide land-based marine debris policy and management decisions in the Great Lakes.	
Objective 1: By the end of 2017, create a summary document of existing land-based marine debris policies and management systems in the Great Lakes.	
Action Strategies	Coordinating & Partner Organizations
<p>1. Inventory and create a summary document on existing policies and best management practices related to land-based marine debris in the Great Lakes.</p>	<p><u>Coordinator:</u> Clean Water Action <u>Partners:</u> Keep America Beautiful, American Chemistry Council</p>

2. Review developed summary document and identify potential target areas for improvement.	<u>Coordinator:</u> Clean Water Action <u>Partners:</u> Keep America Beautiful, American Chemistry Council, Alliance for the Great Lakes
3. Share the developed summary with policy makers in the Great Lakes region and make recommendations for policy improvements.	<u>Coordinator:</u> Clean Water Action <u>Partners:</u> Keep America Beautiful, American Chemistry Council, Alliance for the Great Lakes
<i>Objective 2: Share the developed land-based marine debris action plan with the policy and management communities upon its completion.</i>	
Action Strategies	Coordinating & Partner Organizations
1. Present the finalized action plan at relevant local, regional, and national conferences and/or meetings.	<u>Coordinator:</u> No lead necessary – actions captured in annual reporting. <u>Partners:</u> Everyone
2. Develop a contact list of policy and management representatives for distribution of the final action plan.	<u>Coordinator:</u> NOAA MDP <u>Partners:</u> State/Provincial management programs (Coastal Zone, DNRs) EPA, Great Lakes Sea Grant Network, NERRs
3. Develop a summarized action plan with brief talking points.	<u>Coordinator:</u> Ohio Coastal Management, Great Lakes Sea Grant Network <u>Partners:</u> Michigan Department of Environmental Quality, City of Cleveland Office of Sustainability, Wisconsin Coastal Management
4. Create a general presentation or summary slide on final action plan and share with Great Lakes marine debris community for use in outreach to the policy and management communities.	<u>Coordinator:</u> Ohio Coastal Management, Great Lakes Sea Grant Network <u>Partners:</u> Michigan Department of Environmental Quality, City of Cleveland Office of Sustainability, Wisconsin Coastal Management Program
5. Work with states, municipalities, and other key constituencies throughout the Great Lakes region to fully understand their trash prevention goals, programs, and perceived needs and barriers to success, and develop collaborative regional projects to address those factors.	<u>Coordinator:</u> EPA

Objective 3: Review and prioritize storm water control practices at five municipal districts in the Great Lakes by 2019.	
Action Strategies	Coordinating & Partner Organizations
1. Engage storm water professionals and the Great Lakes Storm Water Management Institute on land-based marine debris issues in the region.	<u>Coordinator:</u> NERRs <u>Partners:</u> Coastal Zone Management Offices, Clean Water Action, EPA, Great Lakes Sea Grant Network
2. Identify existing storm water control practices related to land-based marine debris and identify gaps in programs and/or policy.	<u>Coordinator:</u> NERRs <u>Partners:</u> Coastal Zone Management Offices, Clean Water Action, EPA, Great Lakes Sea Grant Network
3. Implement tools and incentives to leverage action by various groups.	<u>Coordinator:</u> NERRs <u>Partners:</u> Coastal Zone Management Offices, Clean Water Action, EPA, Great Lakes Sea Grant Network
Goal 3: Land-based marine debris is prevented and reduced through an educated and involved community.	
Objective 1: By the beginning of 2016, conduct a needs assessment for future education efforts on land-based marine debris in the Great Lakes.	
Action Strategies	Coordinating & Partner Organizations
1. Identify target audiences and potential new partners for future education efforts.	<u>Coordinator:</u> Alliance for the Great Lakes
2. Inventory educational resources that are currently available and identify gaps in content and style/type.	<u>Coordinator:</u> Alliance for the Great Lakes <u>Partners:</u> Great Lakes Sea Grant Network, NOAA MDP, NERRs, Coastal Training Program, City of Cleveland Office of Sustainability
3. Create new or adapt existing educational materials to fill gaps identified above.	<u>Coordinator:</u> Alliance for the Great Lakes <u>Partners:</u> Great Lakes Sea Grant Network, NOAA MDP, NERRs, WI Coastal Management Program

Objective 2: <i>By the end of 2016, launch at least one awareness campaign for Great Lakes communities regarding land-based marine debris.</i>	
Action Strategies	Coordinating & Partner Organizations
1. Identify and review existing awareness campaigns that could be leveraged.	<u>Coordinator:</u> Keep America Beautiful <u>Partner:</u> Alliance for the Great Lakes
2. Engage a marketing expert to assist in the development of a campaign.	<u>Coordinators:</u> Surfrider & Alliance for the Great Lakes <u>Partners:</u> American Chemistry Council, Great Lakes Sea Grant Network, Keep America Beautiful, Hi-Cone
Objective 3: <i>By 2019, develop a social marketing plan, including 10 communication products to address land-based marine debris in the Great Lakes.</i>	
Action Strategies	Coordinating & Partner Organizations
1. Identify and review effectiveness and impact of existing social marketing programs on littering behavior.	<u>Coordinators:</u> Keep America Beautiful & Alliance for the Great Lakes <u>Partners:</u> Great Lakes Sea Grant Network, Clean Water Action, NERRs
2. Create a brand with localized and targeted messages based on social science research on barriers and benefits. Social science research may include public-opinion focus groups and value identification.	<u>Coordinator:</u> Alliance for the Great Lakes
Objective 4: <i>Conduct five informal education activities on land-based marine debris per year, per lake, to the general public.</i>	
Action Strategies	Coordinating & Partner Organizations
1. Engage the Beach Ambassador Program as well as museums and/or aquariums on educational activities related to land-based marine debris in the Great Lakes.	<u>Coordinator:</u> Alliance for the Great Lakes <u>Partner:</u> Old Woman Creek NERR
2. Organize an annual Boat Float in Lake Erie.	<u>Coordinator:</u> City of Cleveland Office of Sustainability <u>Partners:</u> Cleveland Metroparks, Cleveland Museum of Natural History
3. Stop in and present to coastal communities during field research expeditions.	<u>Coordinator:</u> No lead necessary – actions captured in annual reporting. <u>Partners:</u> All researchers

4. Create land-based marine debris educational displays at public venues (i.e. state parks, museums, marinas, universities, etc.). The displays may be mobile in nature to be easily shared across the region.	<u>Coordinator:</u> No lead necessary – actions captured in annual reporting. <u>Partners:</u> Everyone
5. Encourage large-scale public events (i.e. conferences, etc.) to be “zero-waste.”	<u>Coordinators:</u> Keep America Beautiful & City of Cleveland Office of Sustainability
Objective 5: Conduct five formal education activities on land-based marine debris per year, per lake, to targeted audiences.	
Action Strategies	Coordinating & Partner Organizations
1. Host a regional webinar on land-based marine debris for education/outreach professionals.	<u>Coordinators:</u> NOAA MDP & Alliance for the Great Lakes <u>Partners:</u> Great Lakes Sea Grant Network
2. Host a teacher workshop or class on land-based marine debris.	<u>Coordinators:</u> Great Lakes Sea Grant Network, NOAA MDP <u>Partner:</u> Alliance for the Great Lakes, Old Woman Creek NERR
3. Conduct land-based marine debris educational activities with students of all ages in the Great Lakes.	<u>Coordinator:</u> No lead necessary – actions captured in annual reporting. <u>Partners:</u> Everyone
Goal 4: The impacts of land-based marine debris are reduced through removal and tracking efforts.	
Objective 1: By 2019, bi-nationally record and report count and weight (in tons) of land-based marine debris removed from Great lakes shorelines and watersheds by volunteer programs.	
Action Strategies	Coordinating & Partner Organizations
1. Investigate Canadian volunteer program reporting mechanisms and see how they align with U.S. efforts.	<u>Coordinator:</u> Alliance for the Great Lakes <u>Partners:</u> Surfrider, Ocean Conservancy
2. Identify centralized location that will coordinate and host volunteer coastal cleanup data.	<u>Coordinator:</u> Alliance for the Great Lakes

Objective 2: By 2019, develop and publish recommendations for best practices for removing land-based marine debris.	
Action Strategies	Coordinating & Partner Organizations
1. Investigate existing removal methods for land-based marine debris and analyze for similarities as well as benefits and challenges.	<u>Coordinator:</u> NERRs
2. Develop or adapt best management practices (BMPs) to target specific environments or debris types.	<u>Coordinator:</u> Great Lakes Sea Grant Network
3. Incorporate land-based marine debris BMPs into existing guides (ex. Clean Marina).	<u>Coordinator:</u> Great Lakes Sea Grant Network <u>Partner:</u> WI Coastal Management Program
4. Share BMP recommendations with stakeholders.	<u>Coordinator:</u> Great Lakes Sea Grant Network
Objective 3: Within five years, target removal efforts towards land-based marine debris items that are expected to have the greatest impact or which are most abundant in number.	
Action Strategies	Coordinating & Partner Organizations
1. Analyze existing cleanup data to identify land-based marine debris types, quantities by type, and impact. Reports may be separated by geography due to variations in data.	<u>Coordinator:</u> Alliance for the Great Lakes <u>Partner:</u> Ocean Conservancy
2. Partner with industry, manufacturers, and packaging companies to create targeted removal efforts (Ex. A large retail company like Coca-Cola could participate in a local cleanup).	<u>Coordinators:</u> Hi-Cone & Illinois Tool Works
Objective 4: Create a natural disaster preparedness plan (by state or lake) for land-based marine debris within five years.	
Action Strategies	Coordinating & Partner Organizations
1. Review lessons-learned from Hurricane Sandy response.	<u>Coordinator:</u> NOAA MDP <u>Partners:</u> Alliance for the Great Lakes, Ohio Department of Natural Resources/Ohio Emergency Management Association.
2. Review preparedness plans from other regions and industry partners.	<u>Coordinator:</u> NOAA MDP

3. Engage the U.S. Coast Guard, FEMA, and the Canadian equivalents on land-based marine debris issues in the region as well as the creation of the preparedness plans.	<u>Coordinator:</u> NOAA MDP
Objective 5: <i>By 2019, remove 200 tons of land-based marine debris from Great Lakes environments.</i>	
Action Strategies	Coordinating & Partner Organizations
1. Understand the current baseline of land-based marine debris removed by volunteers in the region. Report on these values.	<u>Coordinator:</u> Alliance for the Great Lakes <u>Partner:</u> Ocean Conservancy
2. Identify funding opportunities and potential land-based marine debris removal projects throughout the region.	<u>Coordinator:</u> No lead necessary – actions captured in annual reporting. <u>Partners:</u> Everyone

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Appendix I: Agenda – Final Workshop (Feb. 20-21, 2014)

Great Lakes Land-Based Marine Debris Action Plan February 20-21, 2014

US EPA Region 5 Office – Lake Superior Room (12th Floor)
77 W. Jackson Boulevard, Chicago, IL 60604

Objectives & Outcomes:

- Develop realistic actions to address land-based debris in the Great Lakes. At the conclusion of the workshop, groups engaged in land-based debris issues in the region will have the ability to use the publicized action plan to prioritize plans and make significant headway in addressing this issue.
- Identify organizations to lead specific actions, identify potential partners, potential funding sources, location(s), and outcomes.
- Finalize a 5-year land-based marine debris action plan for the region.
- Connect federal agencies, states, tribal nations, researchers, business leaders and non-governmental organizations in the Great Lakes region to identify potential opportunities for collaboration related to marine debris.
- Regionally support and contribute to The Honolulu Strategy. The Honolulu Strategy sets forth a results-oriented framework of action with the overarching international goal to reduce impacts of marine debris over the next 10 years. Outcomes of this workshop will specifically support Goal A: Reduced amount and impact of land-based sources of marine debris introduced into the sea; & Goal C: Reduced amount and impact of accumulated marine debris on shorelines, in benthic habitats, and in pelagic waters.

Target Audience: Representatives from federal, state, tribal, and nongovernmental organizations directly involved in marine debris activities in the Great Lakes, including those with expertise on land-based debris.

Facilitators: Heather Elmer, Sarah Opfer, Jamie Cross

<u>February 20</u>	EPA Region 5 Bldg, Lake Superior Room (12th Floor)
12:30pm (CST)	Registration
1:00pm	Welcoming remarks and introductions <ul style="list-style-type: none"> • Intros • Venue logistics • Ground rules • Review agenda and meeting objectives • Welcoming remarks from Mr. Cameron Davis – Senior Advisor to the Administrator of EPA on Great Lakes issues. • Ice Breaker Question – Key Pad Polling
1:30 – 1:40pm	Marine Debris – Big Picture and Background on Previous Efforts <ul style="list-style-type: none"> • Brief overview of progress • Additional objective
1:45 – 3:15pm	Goal #1 - Action Review and Development - BREAKOUT <ul style="list-style-type: none"> • Review potential actions already developed, add as needed. • Identify coordinating organization, potential partners, funding options, locations, and outcomes.
3:15 – 3:30pm	BREAK
3:30 – 4:45pm	Goal #2 - Action Review and Development - BREAKOUT <ul style="list-style-type: none"> • Review potential actions already developed, add as needed. • Identify coordinating organization, potential partners, funding options, locations, and outcomes.

4:45 – 5:00pm	Check In and Wrap Up
5:00pm	Adjourn

<u>February 21</u>	EPA Region 5 Bldg, Lake Superior Room (12th Floor)
9:00 – 9:15am (CST)	Recap of Day 1
9:15 – 10:30am	Goal #3 - Action Review and Development - BREAKOUT <ul style="list-style-type: none"> • Review potential actions already developed, add as needed. • Identify coordinating organization, potential partners, funding options, locations, and outcomes.
10:30 – 10:45am	BREAK
10:45 – 12:00	Goal #4 - Action Review and Development - BREAKOUT <ul style="list-style-type: none"> • Review potential actions already developed, add as needed. • Identify coordinating organization, potential partners, funding options, locations, and outcomes.
12:00 – 1:30	LUNCH - ON YOUR OWN
1:30-2:45pm	Goal #5 - Action Review and Development - BREAKOUT <ul style="list-style-type: none"> • Review potential actions already developed, add as needed. • Identify coordinating organization, potential partners, funding options,

	locations, and outcomes.
2:45-3:00	BREAK
3:00 – 4:30	Next Steps <ul style="list-style-type: none">• Roll-out plan• Timeline• Accountability<ul style="list-style-type: none">○ Performance measures follow-up – incremental progress with each action group○ How to monitor progress of action plan○ Regular communication options
4:30-5:00	Wrap-up <ul style="list-style-type: none">• Evaluation and final check-in

Appendix II: Participant List – Final Workshop

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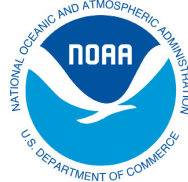
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